BRACEVILLE BRIDGE
(Alton Railroad Overhead Bridge)
Spanning the Southern Pacific Railroad at State Route 129 (Old Route 66)
Braceville vicinity
Grundy County
Illinois

HAER No. IL-141

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

~~REDUCED COPIES OF MEASURED DRAWINGS~~

HISTORIC AMERICAN ENGINEERING RECORD
MIDWEST SUPPORT OFFICE
National Park Service
U.S. Department of the Interior
1709 Jackson Street
Omaha, NE 68102

HISTORIC AMERICAN ENGINEERING RECORD

BRACEVILLE BRIDGE

I. INTRODUCTION

Present Location:	Braceville (Also known as Gardner or Mazonia) Illinois Highway 129 (formerly US 66) Spanning the Southern Pacific Railroad (formerly Chicago and Alton Railroad). 1.2 miles southwest of Braceville; 2.3 miles northeast of I-55 and IL 129 intersection at Gardner.
USGS Quadrangle:	Gardner 7-1/2, Illinois Lat. 41°-12'-42.53"; Long. 88°-16'-46.50" UTM 16.392640.4562660
Inventory Data:	Braceville Bridge Illinois Structure No. 032-0062 F.A. Route 77, Section 91-VB-I SE 1/4 of Sec 34, T32N, R8E Grundy County
Date of Construction:	Plans approved March 14, 1939, Opened to traffic December, 1939.
Owner, Custodian:	State of Illinois
Present Use:	Vehicular bridge, permanently closed and programmed for removal.
Significance:	This bridge, incorporating a tied arch main span, was the first modern bridge in Illinois of this type to support the floor with hangers, without the use of diagonals. It was built near the earliest alignment of U.S. Route 66 to relieve traffic congestion near Gardner. This early route through the area was an improvement of the original Chicago-Springfield Road.
Historian:	John B. Nolan, S.E. 31 December 1999

II. HISTORY

In 1854, the Chicago and Mississippi Railroad, later the Chicago and Alton and now the Southern Pacific Railroad, was extended northward from Bloomington to meet the Rock Island Railroad at Joliet. The alignment, approaching across prairie terrain from the south, followed an earlier trail connecting Joliet with the down state cities of Bloomington, Springfield, and East St. Louis. Joliet, at the convergence of canal and early railway shipping routes, was a natural gateway between Chicago and down state, and of sufficient importance for development as a roadway hub.[1]

When U.S. Route 66 was first opened to traffic in 1926, the original alignment followed the traditional route from Chicago, through Joliet and continuing southerly along the route of present Illinois Route 53, then turning southwesterly paralleling, and south of the Alton tracks, meeting the present Route 66 alignment near Gardner and continuing to St. Louis.

Extension of the outer Joliet bypass, later used as the corridor of Route 66 and its successor, Interstate 55, was reported in the 1937 Annual Report as the extension of Illinois Route 59 from Plainfield to Gardner, the lower 13 miles bending southwesterly north of and paralleling the Alton tracks.[2]

At the close of 1938, 6.78 miles of pavement, now designated Federal Aid Route 77, and two bridges remained to be completed on the outer Joliet bypass. The first bridge was over the Mazon River, and the second over the Alton Railroad at Mazonia, a former settlement near the bridge, where the main line of the Alton divides at the Pequot spur to provide a valley route access to freight yards in southern Joliet. Plans for both structures were complete and ready for an early award in 1939.[3]

The 1939 Division of Highways Annual Report of Major Projects states:

> "The design of the overhead structure for the separation of grades of U.S. Route 66 and the Alton Railroad tracks near Mazonia in Grundy County is unique in that the span over the tracks is the first tied steel arch span to be built in the state. Because of the large skew angle between the tracks and the centerline of the highway, a clear span of 249 feet is required and this type of design proved to be the most practical...(description of span lengths)...Contracts amounting to $188,778.51 were awarded in May 1939 for construction of the structure and approaches".[4]

The American Society of Civil Engineers recognized the bridge with a 1939 Honorable Mention - Class C - Award. The caption of the clipping gives the total cost as $146,147.79.[5]

The bridge, planned as the northbound lane of a divided highway, served on U.S. Route 66 for only a few years. The proposed southbound lane bridge and highway were never built. Within ten years, the lower segment of the outer Joliet route alignment had been relocated and dual highways built to the west, bypassing Gardner and Braceville. The route replaced is presently designated Illinois Route 129, and use of the earlier Route 66 and the Braceville bridge, was limited to local traffic. The even earlier Route 66 through Joliet had served several World War II industries but was largely abandoned by through traffic after the opening of Interstate Route 55.

Bituminous surfacing was added to the bridge deck, and Pier 3 surfaces were repaired in 1964. Additional substructure repairs were necessary in 1987. An inspection in 1994 found critical conditions in the deck slab and substructure, and the bridge was permanently closed.

11I. THE BRIDGE

A. The Bridge Type

The main span of the Braceville bridge is a through steel tied arch, with seven wide flange beam approach spans on the north and six on the south. Spill-through abutments and columned piers are concrete on spread footings.

Tied arch spans were developed with other trusses when iron and steel replaced wood. "Rainbow" bridges built in Illinois as early as 1865 used proprietary arches fabricated from now outdated shapes and plates. Those often used steel straps or fluted rod hangers to support the deck, and lower chord bars or rods not unlike a bow string, to restrain the horizontal thrust at arch ends. No significant diagonal truss members were incorporated in those bridges.

When the first Hudson River bridge was being planned in New York in 1890, an English Engineer, Max Ende, submitted an alternate design which he claimed would be less costly than the suspension bridge under consideration. Ende's crescent arch truss would have provided a clear span of 2500', 1200' longer than any arch built up to that time. The suspension span proposal was accepted and, after considerable redesign and changes in location, the result, now named the George Washington Bridge, was completed in 1931 with a main span of 3500'.[7]

Three weeks after the opening of the George Washington Bridge another bridge was opened in New York harbor, the monumental Bayonne, a tied arch truss with a clear span of 1652' and a rise of 266'.[8]

The arch, one of the oldest and most persistent of bridge forms, is frequently overlooked today in the announcements of dramatic new bridge types. The arch truss is frequently used in combination with continuous trusses and cantilever approach spans for major river crossings.

The tied arch found renewed favor with American engineers in the 1930s. David Plowden describes this arch type:

> In this form of arch the horizontal thrust is borne by girders or trusses running longitudinal beneath the deck for the full length of the arch...specifically, the tied arch is used where conditions preclude building foundations large enough to sustain the thrust of an arch...In most American examples the rib is heavier than the tie itself, but in Europe where the configuration is frequently reversed, the more rigid tie prevents excessive rib distortion under asymmetrical loadings.[9]

Two years after letting the Braceville Bridge contract, designers prepared plans for a similar bridge over the Rock River at Grand Detour

having three tied arch spans of 250', 325' and 250'. The bridge was replaced in 1994, due to deteriorated deck and substructure conditions.[10]

The state inventory does not distinguish between true tied arches and trusses with an arch configuration. It is estimated that only 11 of the 17 listed tied arch bridges may be of the true type. Of those 11, three were built in 1910 or earlier and eight after 1939. The latter bridges have employed modern shapes and plates assembled by rivets, or more recently, welding.[11]

B. The Name Plate

ALTON R.R. VIADUCT
BUILT 1939 BY
STATE OF ILLINOIS
HENRY HORNER - GOVERNOR
FEDERAL AID ROUTE 77 SEC. 91-V
FEDERAL AID PROJ. 373-F

C. The Designers

Seven engineers from the Division of Highways participated in the layout, design computations, drawing and checking.

George C. Ashton, employed 7/14/24 to 12/31/24 as Junior Engineer; 8/26/38 to 12/25/38 as Assistant Engineer in Design.

Samuel Barnovitz, employed 3/19/31 to 1/31/33 as Junior Engineer Bridge; 9/1/33 to 12/31/41, title not available.

H. E. Eckles, employed 12/10/34 to 9/4/39 as Junior Engineer in Design.

William John Mackay, employed 6/16/26 to 10/9/68, starting as a Junior Engineer in Design and finishing as Bridge Office Design Engineer.

Charles Macklin, employed 3/4/35 to 3/14/35, 9/1/35 to 1/31/41, 8/15/44 to 6/30/45 as Junior Engineer of Design. Born May 4, 1904 in Nanking, China, Macklin was later self-employed locally as an Architect-Engineer. He died November 30, 1973.

F. R. Michuda, employed 2/7/35 to 1/31/41, started as Junior Engineer in Design

William N. Sommer, employed 6/5/30 to 3/31/72, starting as a Junior Engineer in Design, finishing as Inventory, Rating and Investigation Engineer in the Bridge Office, then moving to the Bureau of Maintenance to set up the Illinois Bridge Inspection program. After retirement he worked with a local consulting company. He served with Seabees in the Pacific during WWII. Sommers died February 1, 1981.

Two tracers inked the final plan sheets:

V. F. Mulacek, employed 2/11/35 to 2/28/42 as a Junior Engineer in Design.

Myron Miller, employed 2-10-37 to 3-13-37 as a Junior Engineer in Design; reemployed 3/1/38 to 9/30/63, final grade Engineering Technician IV.

D. The Fabricator

Bethlehem Steel is given fabrication credit in the caption of a photo of this prize winning bridge. The source of the photo is unidentified.

E. The Erector, Contractor

The Joliet Bridge and Construction Company. Early records list the Joliet Bridge and Iron Company as active in 1898 to 1901. It is not known if the company was assimilated by the American Bridge Company expansion in the early 1900s. The company is first listed in the Joliet City Directory of 1904-1905 with Raymond K. Morrison as president. The last listing with Morrison as president is in 1983. In the 1984 and final listing, J. Zahorik is president. It is reported that the company relocated to nearby Plainfield. This report cannot be verified.[14]

F. Structure Description

This grade separation structure, measuring 1095'-6" back to back of abutments, is built on a vertical curve at right angles. A center tied arch span, 252'-6" between bearings, was selected to cross the two existing railroad tracks skewed about 74[o]. A proposed shift in track alignment with the addition of a third track, was provided for at the time. The north approach consists of one three-span unit plus a four-span unit. The south approach consists of two three-span units. Approach spans are wide flange beams. A minimum clearance of 22'-0" is provided. Piers of two or three columns and spill through abutments are used. Substructure units are of concrete and on spread footings.

The bridge was designed to carry north-east bound traffic. A projected companion bridge was to carry south-west bound traffic. The design loading used was I-15. The I-loading is belived to be an Illinois loading similiar to the present H-15 loading of AASHTO, The American Association of State Highway and Transportation Officials.

Measurements and structural details are summarized from the original design plans. Portions of the structure plans are attached for a general concept. Copies of the original plans are on microfilm in the IDOT archives.

Superstructure:

Approach spans. Four continuous multi-beam units, five rolled beams at 6'-9" centers; welded cover plates at all interior piers, ends tapered to 2", top and bottom; diaphragms, 12WF25, at interior piers, 0.4 point of end spans, center of interior spans and at field splices; end of span diaphragm, 12 WF40; channels 12"x25 lbs. between outer beams at rail post brackets, generally about 9'-6 1/2" centers, and variable between posts at end bearings. Rivets 3/4" except 7/8" in flange of field splices.

Spans 1, 2 and 3, north end. Continuous three-span unit, 33WF133, two field splices, in center span. Span lengths between bearings: 59'-11", 77'-0", 60'-0"

Spans 4, 5, 6 and 7. Continuous four span unit, 33WF125, one splice, span 5, two splices span 6. Span lengths between bearings:60'-0", 75'-0", symmetrical about centerline.

Spans 9, 10, 11; 12, 13, 14. Two continuous three-span units, 33WF125, two field splices in center span. Span lengths between bearings: 56'-3", 72'-6", 56'-3", both units.

Approach spans floor system. Five beams are stepped to crown, fillets above beams provide for deflection. See Deck Reinforcement below.

Main span, span 8. Through tied arch, nine panels at 27' 8", settled length 249'-1 1/8"; rise 42-0"; arch is compound curve, radii, three end panels 236.04+', center three panels 183.66+'; all details are symmetrical about bridge centerline, U4.5-L4.5.

Arch rib box. Depth, back to back of angles, varies uniformly from 5'-0" at L0 to 2'-6" at U4.5, span center; top plate 30x1 1/8"; bottom plate 30x 1/2", 15x18" open holes at 4'-0"+/- centers; two web plates 9/16"; four angles 6x6x3/4", flanges out; interior diaphragms 12WF64 on radial lines at quarter points between hangers, 10x18" open holes near bottom; arc web stiffener angles 3x3x3/8", on web center, L0-U3, with 15x3/8" stay plates at 8'-0" cts.+/-. Field splices near U1.40 and U3.23, contact surfaces milled. Shop web splice, milled, at centerline. Top lateral struts at portals (U1.26) and panel points; riveted girders, ends match arch rib depth, bottom arched to 2'-6" depth at centerline; 3/8" web, two flange angles 4x6x3/8" top and bottom. Top lateral cross-bracing between struts 12WF36. Box elements copper bearing steel, rivets 7/8"rd.

Hangers. 16WF58 at all panel points, encompased full depth in arch.

Lower chords. 14WF167, spliced 4'-6" past L1 and L3; web flat, drain holes 3" at panel third points.

Lower lateral cross-bracing. Two angles 4x4x5/16" in two end panels; two angles 4x4x3/8" in interior panels, 3/8" connection plates.

Arch deck system. Intermediate floor beams 36WF194, end floor beams 36WF160, attached to hangers, 12"+/- connection brackets cut from 30WF116 added; five stringers, interior 24WF80, exterior 21WF73; stringers framed to floor beams, tops follow super-elevated slope draining south; stringers embedded 1/4" in slab, erection seats on floor beams.

Concrete deck. Slab 7", roadway width 26'-0", constant slope, 0.1"/', draining east; exterior stringers and beams support 8" tapered curb blocks and 2'-0" safety walk cantilever.

Reinforcement. Longitudinal bars, top 1/2" square at 20 1/4" centers, bottom 5/8" rd at 6 1/2"; over intermediate piers two 3/4" round bars, 22'9" long added between 1/2" square bars. (In the main span no additional longitudinal bars are required at floor beams); transverse bars at 5 1/2" centers, alternate bent bars 3/4" round, straight bars top 5/8" bars, ends hooked, and bottom 1/2" square bars.

Deck drainage. Approach spans: 4"x6" cast iron elbow drains in east curbs at 9'-5"+/- centers, excepting main span and abutment spans where cast iron frames and grates, carry the drainage into pipes 6" cast iron.

Bearings, approach spans. End bearings of all units, rollers 6" diameter, bearing on 11-1/2" plates, top beveled, bottom 1-5/8" or 1-7/8". Intermediate pier rockers, shaped from 10WF136 sections, 11-1/2" long; bearing plate thickness, top 2" with bevel, bottom 2-1/4", lead plate 1/8" all bearings.

Bearings, main span. Bearing pins pass through ends of box web plates and diaphragm 14WF174, 7 1/2" diameter pins, 1'-6 1/2" grip. Fixed (north) end, Pier 7, cast steel shoes, bearing on three 2" ribs, height to pin center, 1'-6 5/8", bottom bearing plate of assembly 1'-6"x 2'-7"x 2".

Expansion (south) end, Pier 8, cast steel rockers, bearing on three 2" ribs, height to pin center 2'-0", radius of rocker 24", rocker length 2'-7" includes 2x2" teeth welded in milled slot at each end 1x1/2" deep on centerline; bottom bearing plate 1'-9"x1'-6"x35/8" thick. Teeth, shaped on end, fit in 2 1/4" rd. holes in bearing plate; raised longitudinal bar fit on bearing plate centerline fits into 1"wide slot in rocker casting.

Expansion Devices. Flame cut finger plates are located on roadways at Piers 3 and 11, fingers 2x4 1/4x1 1/2"; Pier 7 fingers 2x3 3/4x2"; Pier 8 fingers 2x4 3/4x2"; all supported on pedestals bolted to end floor beams or diaphragms. Expansion plates on safety walks and curb faces.

Blast Plates. 5'-0"x1/2" over two existing tracks, hangers eight 1/2x3" bent connection plates welded to blast plates, 3 1/2x3 3/8" angles welded to top of bottom flange each stringer, similar with longer 1/2" plates to diaphragms. Slotted holes permit adjustment. No end deflection slope is provided.

Handrail. Upper rail 4" car channel 13.8 lbs., top 32" above walk. Lower rail 8" ship channel 18.7 lbs., top 15" above walk. Post spacing in spans around 9'-3", Post support bracket is fastened to outer stringer or beam web and to safety walk with two bolts 7/8"rd.

Substructure:

Abutments. Spill-through type on three columns 2'-3"x21'-9"x variable width 3'-0" to 10'-6". Spread footing 2'-0"x11'-6"x 29'-9". Cap beam 2'-9" high x 3'-0" wide x 29'-6" on face of cap. Back wall 12" with approach notch. Integral wings, 9'-6" long, extend 3'-0" behind cap and curve outward 1'-10".

Piers 7 and 8, supporting main and adjacent spans. Two columns, rectangular 4'-6"x5-11" with corner fluting, overall height 25'-9"; Top rib depth 4'-5 to 6'-0", supports five beams of approach; crash wall, 4'-6" wide, 4'-0"x4'-0", spread footing 2'-3"x 11'-0"x44'-0".

Piers 1-6, 9-13, approach piers. Three columns 2'-3" square, variable height 23'-0" to 26'-3", includes 1'-6" 45° corbels at tops; cap 1'-6"x2'-11"x50'-0"; footing wall 3'-0"x2'-3"x27'-9"; footing 1'-6"x8'-6"x29'-0".

G. Present Condition And Modification

The bridge is permanently closed due to significant section loss in the deck, substandard roadway width, critical condition of pier concrete and crack in south side of Pier 3 cap.

In 1964 the deck had been extensively patched and 1-1/2" bituminous surfacing added. In 1989 extensive pier surfacing repairs had been made to surfaces of Piers 3, 7, 8, and 11.

H. Ownership and Future

There are no plans to replace this bridge. Although this tied arch bridge is of more than usual historical and structural interest, as the first major bridge of its type in Illinois, it has been bypassed and no longer serves a need in the roadway network. Its deteriorated physical condition and the unsuccessful attempt to market the structure for non-motorized vehicle use has led to a decision to remove the bridge. A contract is scheduled for an April 2000 letting, and total removal will be effected in the Summer.[15]

IV. END NOTES

[1]Fayette Baldwin Shaw, PhD., Early Means of Transportation (Will County Historical Society, Summer, 1992) pp. 18ff.

[2]Illinois Division of Highways - 20th Annual Report, (Illinois Department of Public Works and Buildings, Springfield, 1937). p. 36, 37; United States Geological Survey, USGS, Gardner 7.5 Minute Series Topographic Map (Washington, D.C.: USGS, 1983 Provisional Edition; Atlas and Plat Book, Will County Illinois (Rockford: Rockford Map Publishers, Inc. 1998).

[3]Ibid, 1938, p.41.

[4]Ibid, 1939, p.41.

[5]1939 Prize Bridges, American Institute of Steel Construction, (Only clipping available).

[6]Master Report - Inventory Data, Illinois Structure Information System (Illinois Department of Transportation (IDOT) Data Processing Unit, November, 1999).

[7]David Plowden, Bridges: The Spans of North America. (New York: Viking Press, 1974) pp. 246,7.

[8]Ibid. p. 257.

[9]Ibid. p. 259.

[10]22nd Annual Report, 1939. p.50; Master Report, Illinois Structure 052-0036.

[11]IDOT Data Bank, Bridge Inventory Data. (Springfield, Urban Program Planning, Data Management Unit.) Judy Buckman, contact.

[12]IDOT Historical Record Sheet, prepared by District Three.

[13]Personnel record file assistance by Martha Williams, IDOT Personnel Record Assistant, and recollections by the author. Data is incomplete.

[14]Joliet City Directories, selected 1900-1985. (Chicago: R. L. Polk Co).

[15]Conversation with Greg Mounts, Operations Engineer, IDOT District Three, 815-434-8417.

V. BIBLIOGRAPHY

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Shaw, Fayette Baldwin, PhD., "Early Means of Transportation", Quarterly. Joliet: Will County Historical Society, Summer 1992. (History of early railroads in Will County).

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Illinois Division Of Highways, Annual Reports, 1937, 1938, 1939, 1941, 1942. Springfield: Department of Public Works and Buildings.

D. Files

IDOT Payroll Records, Bureau of Personnel Management,
Martha Williams, Personnel Record Assistant.
Telephone 217-782-5033

E. Library Resources

Department of Transportation Library
2300 South Dirksen Parkway
Springfield, Illinois 62764
Gisela Motzkus, Librarian
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(Department publications)

Illinois State Historical Library
Old Capitol Square
Springfield, Illinois 62702
Telephone 217-524-6358
(Histories, newspaper microfilms)

Illinois State Library
Arlyn Sherwood, Map Librarian
300 South Second Street
Springfield, Illinois 62701
Telephone 217/785-5600
(Map collection)

Joliet Public Library
Information Services: Roger Gambrel
150 N. Ottawa Street
Joliet, IL 60432-1632
Telephone 815/740-2666
Local history archives

F. Conversations

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Illinois Department of Transportation, District Three
700 East Norris Avenue
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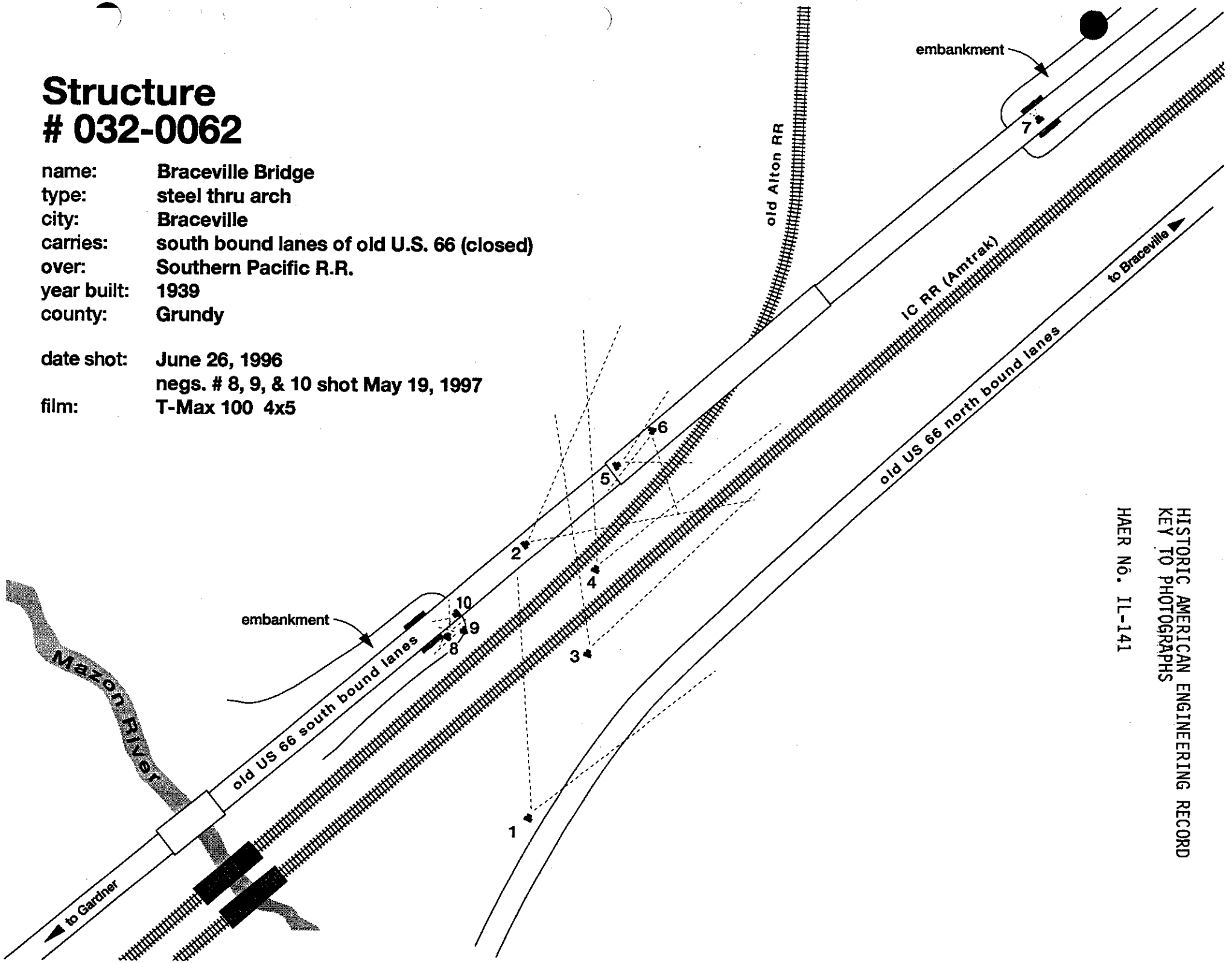
December 31, 1999

Structure
032-0062

name:	Braceville Bridge
type:	steel thru arch
city:	Braceville
carries:	south bound lanes of old U.S. 66 (closed)
over:	Southern Pacific R.R.
year built:	1939
county:	Grundy
date shot:	June 26, 1996
	negs. # 8, 9, & 10 shot May 19, 1997
film:	T-Max 100 4x5



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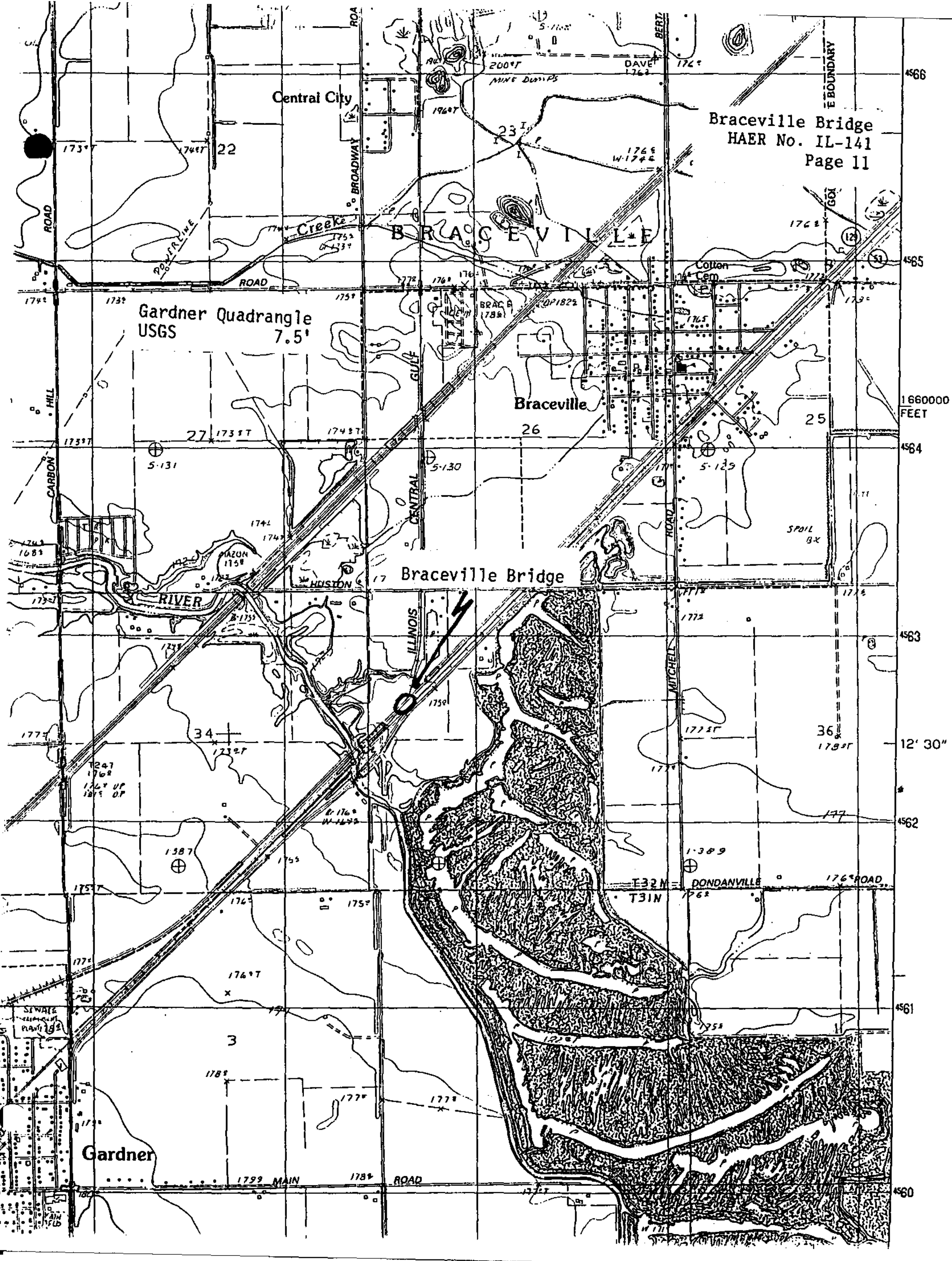
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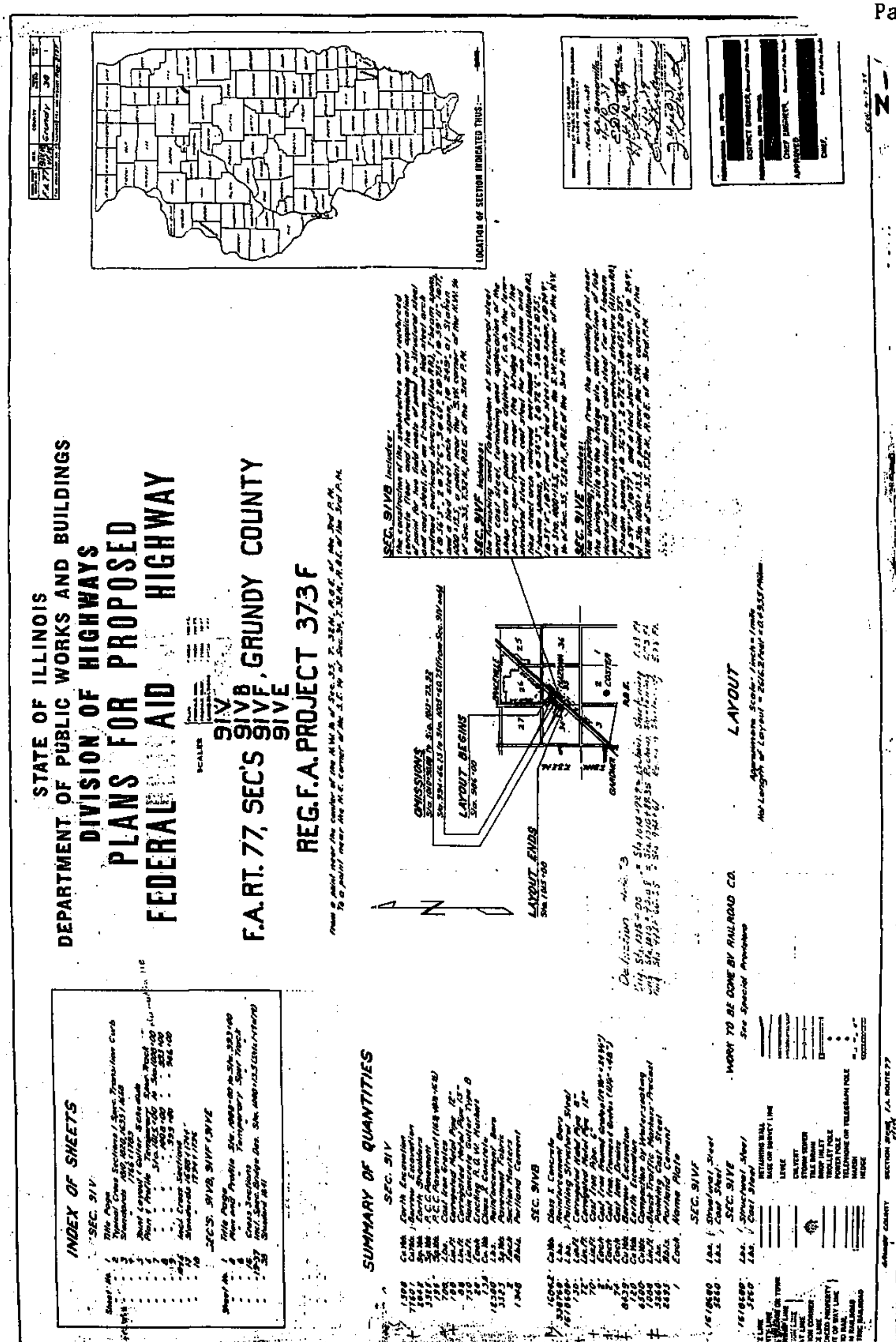
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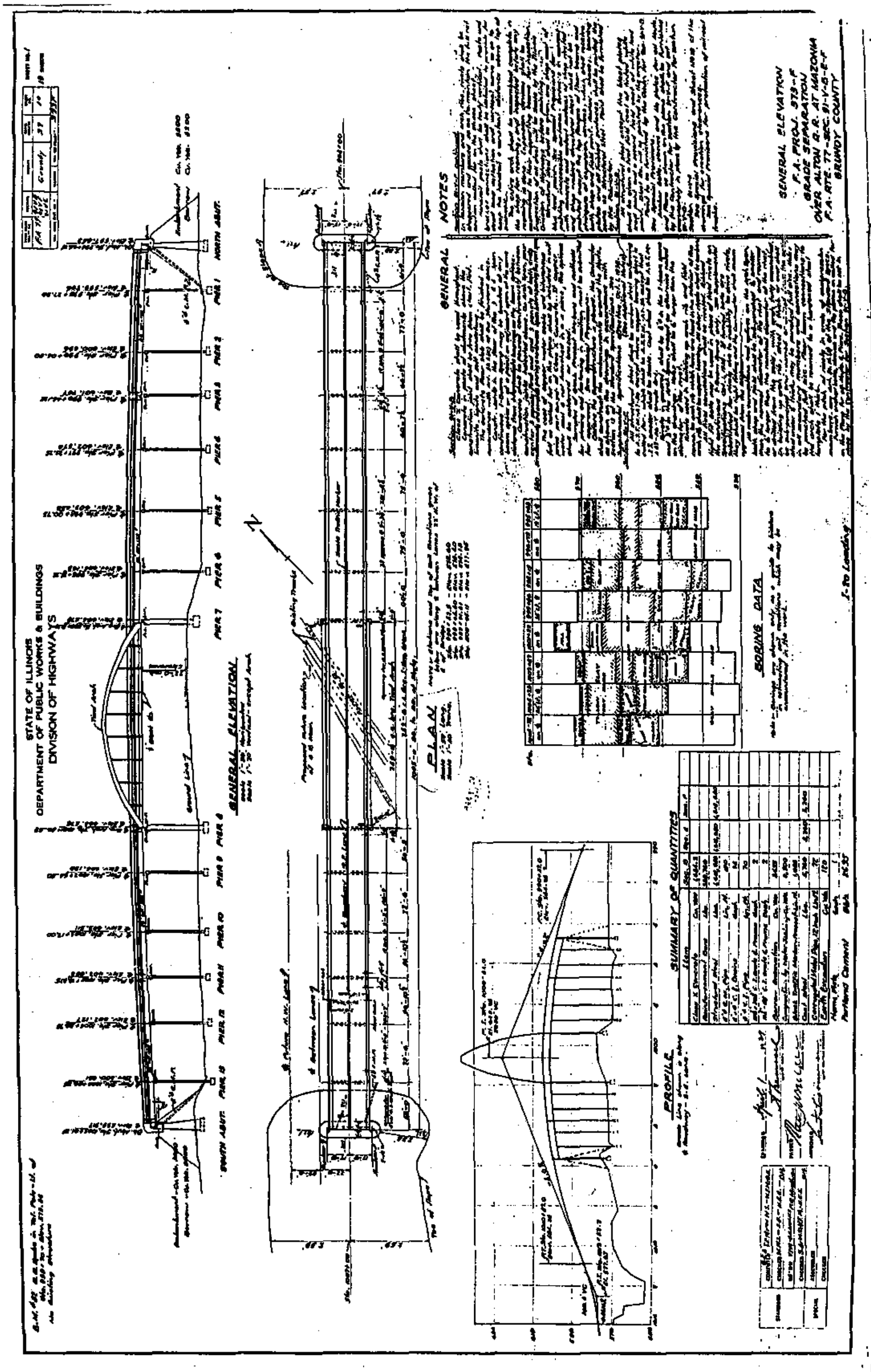
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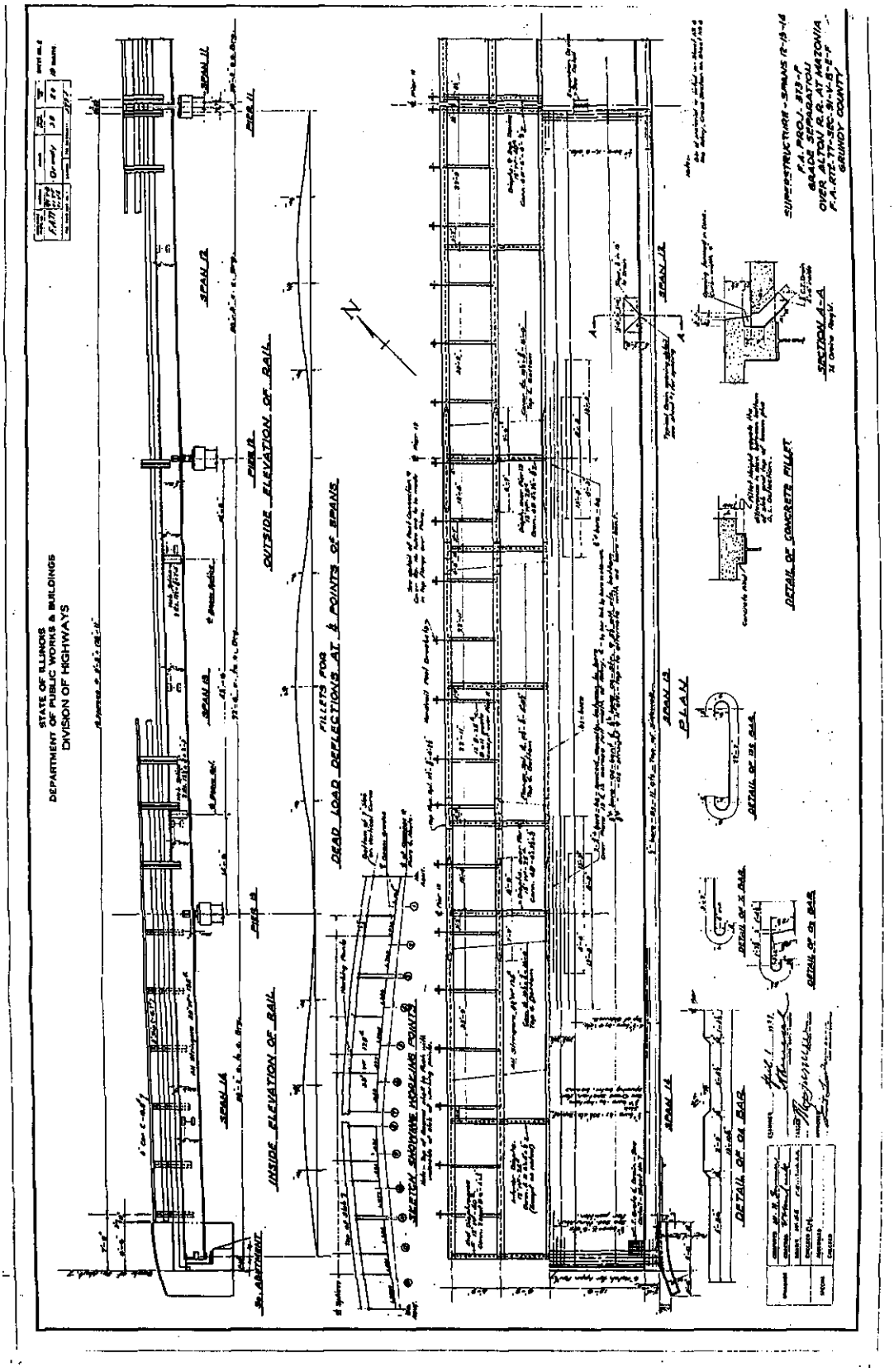
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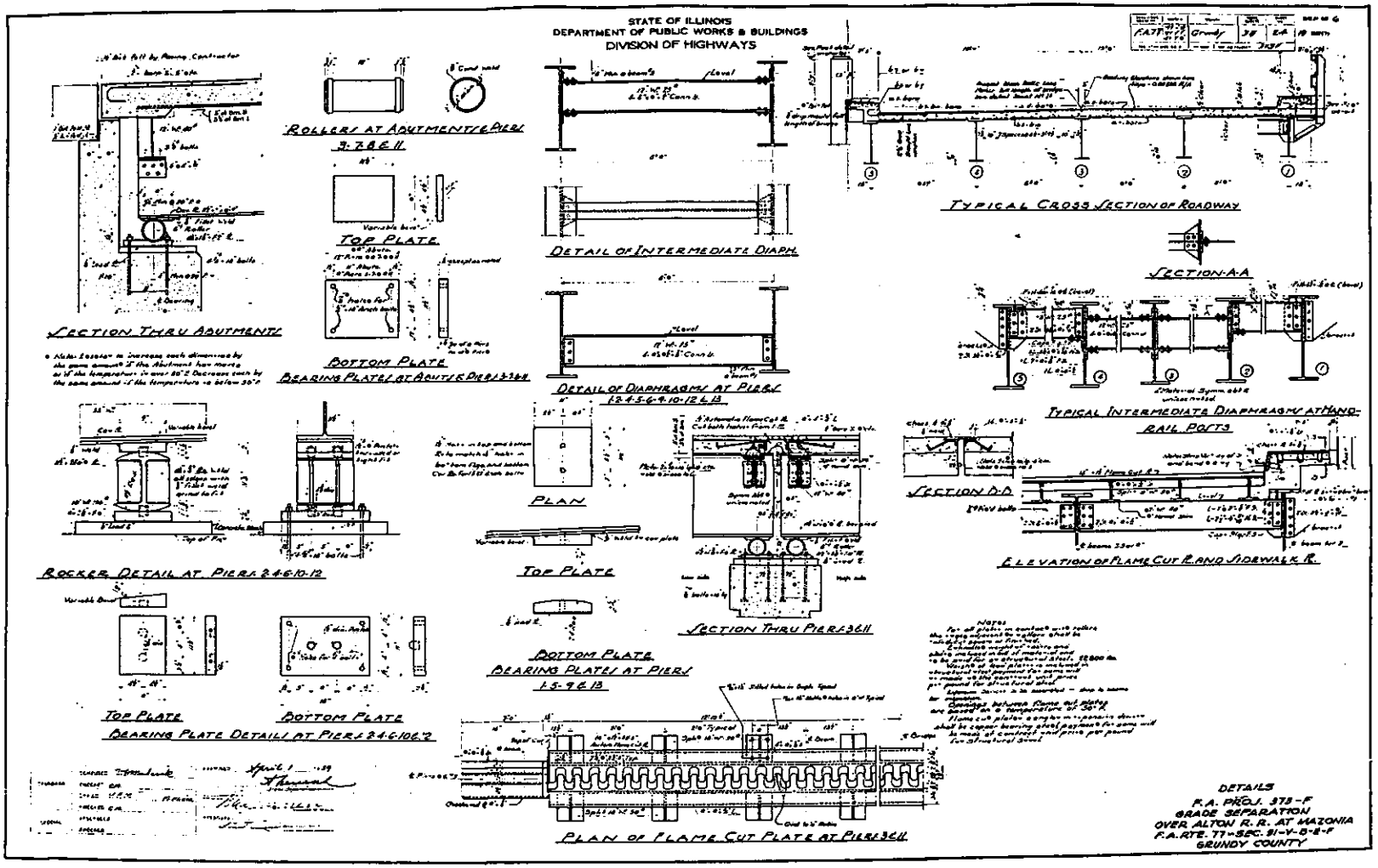
F.A. RTE. 113
GRUNDY COUNTY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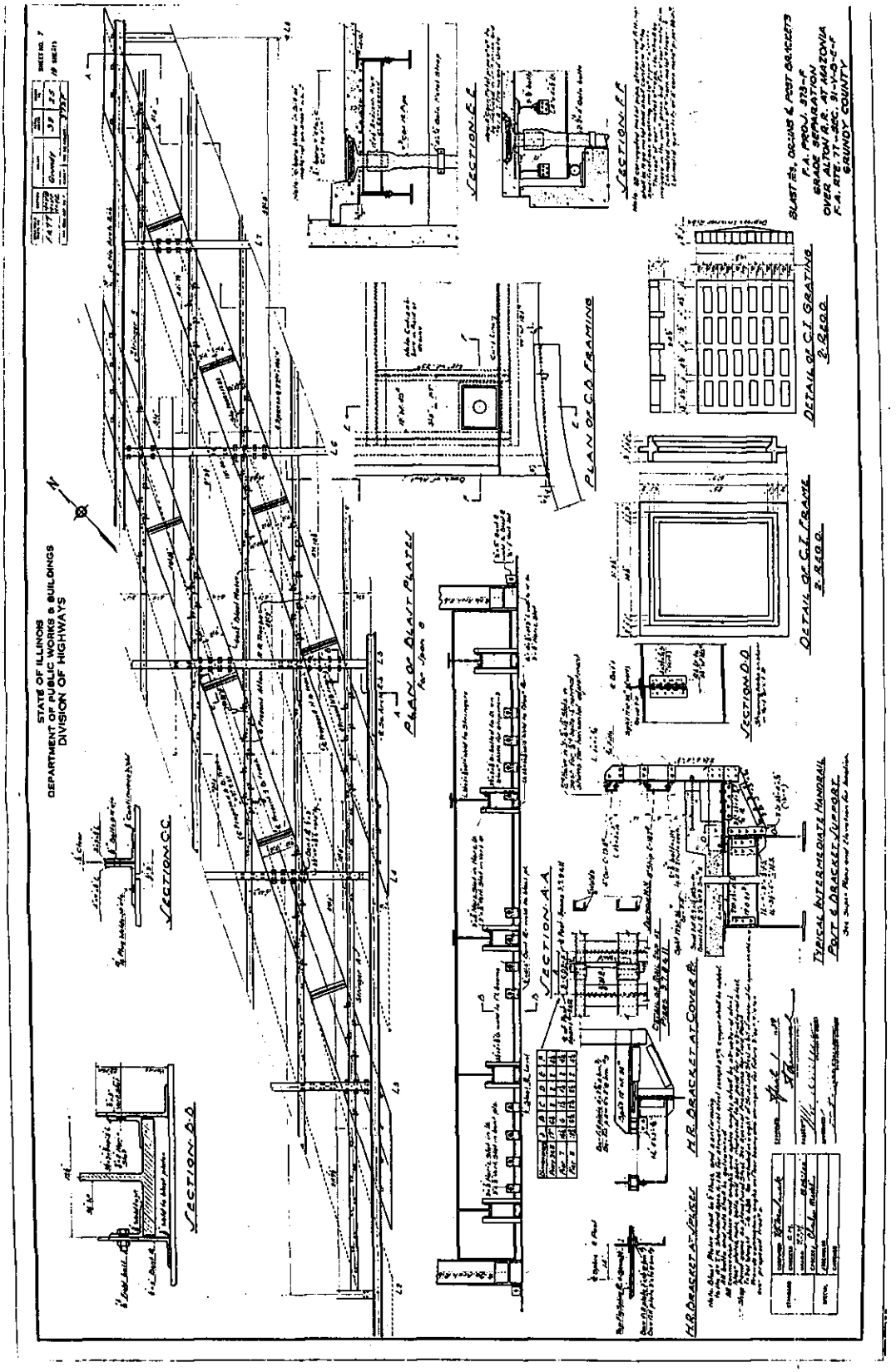
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DETAIL OF C.I. GRATING
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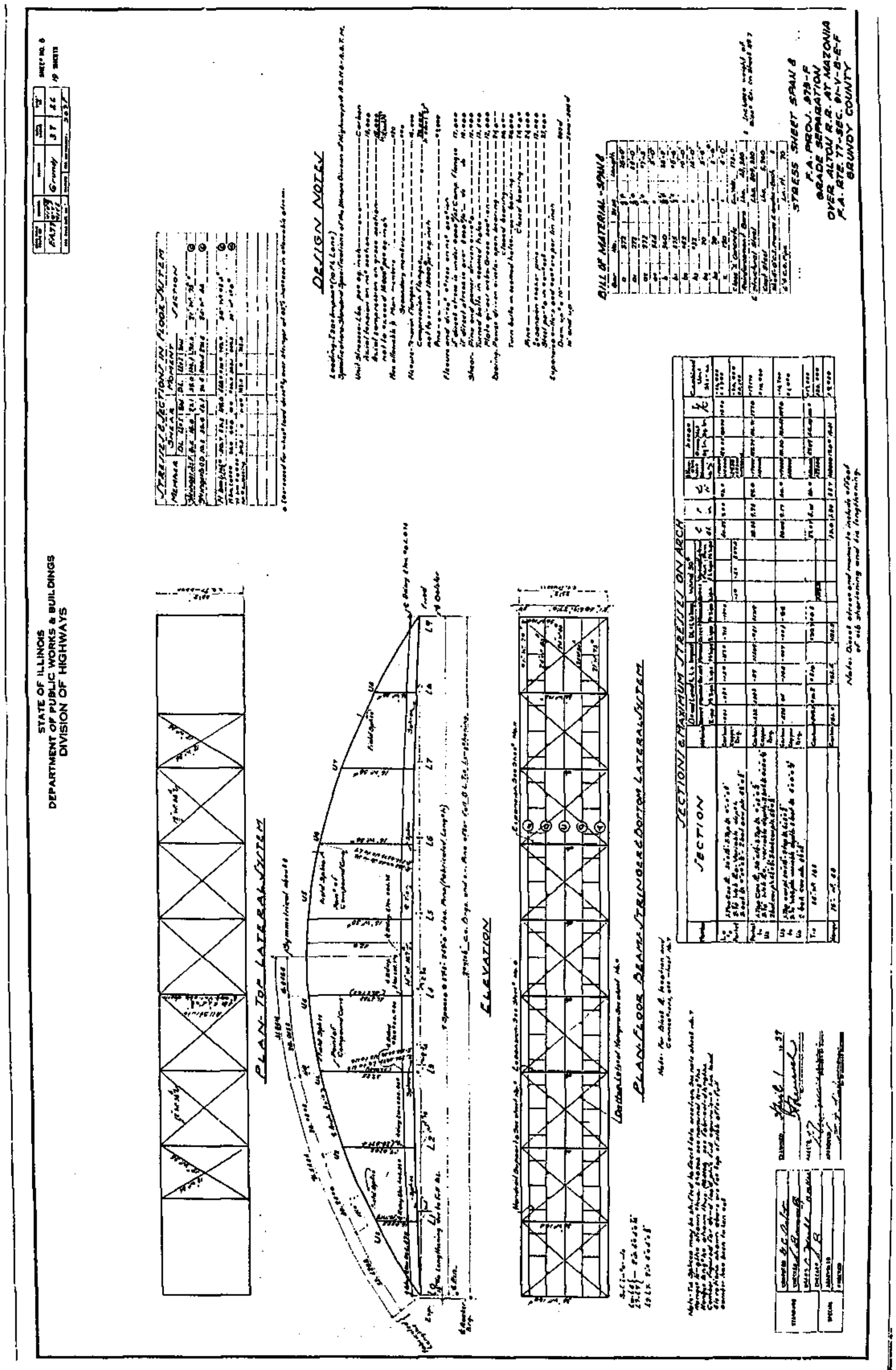
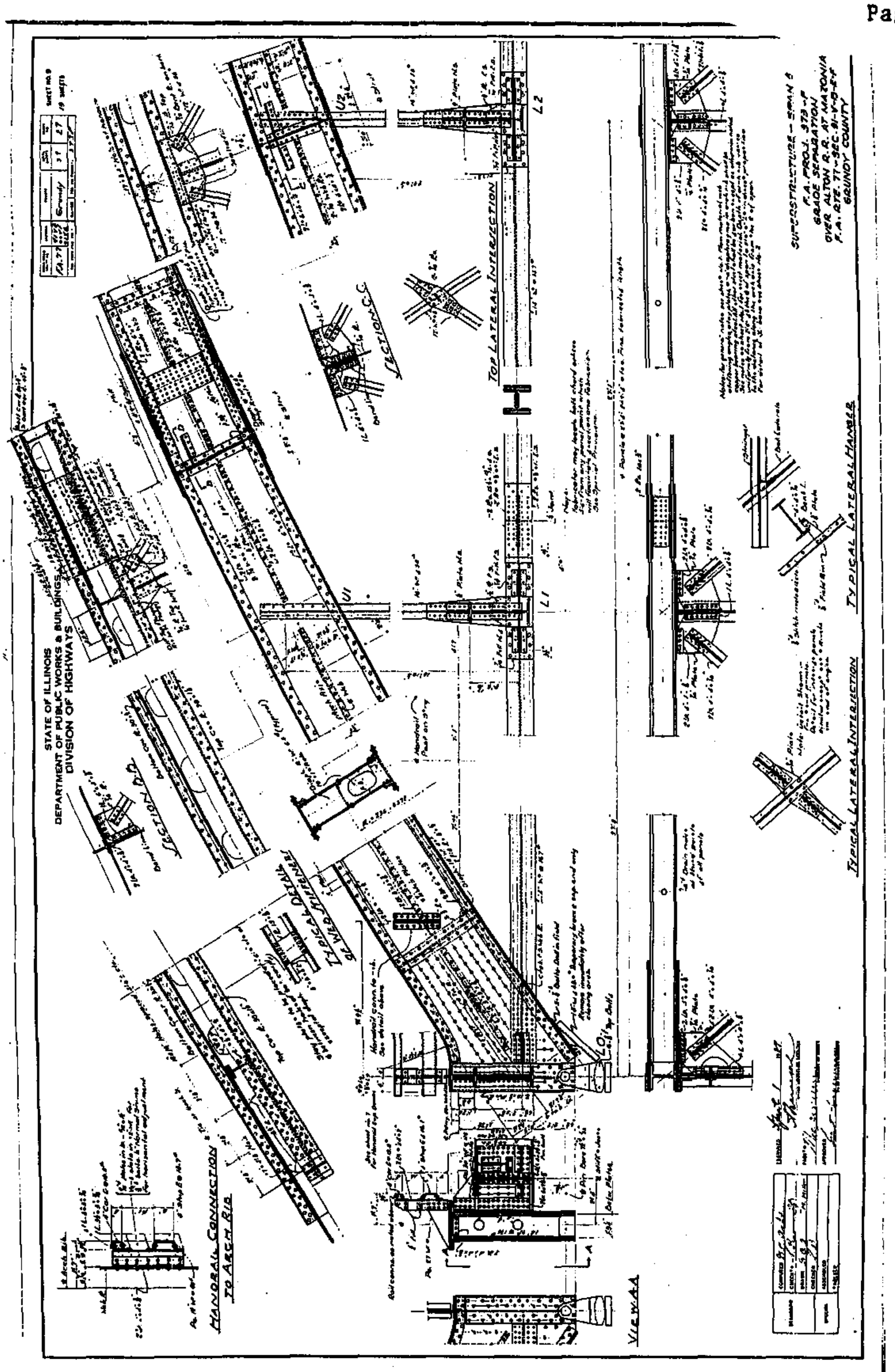
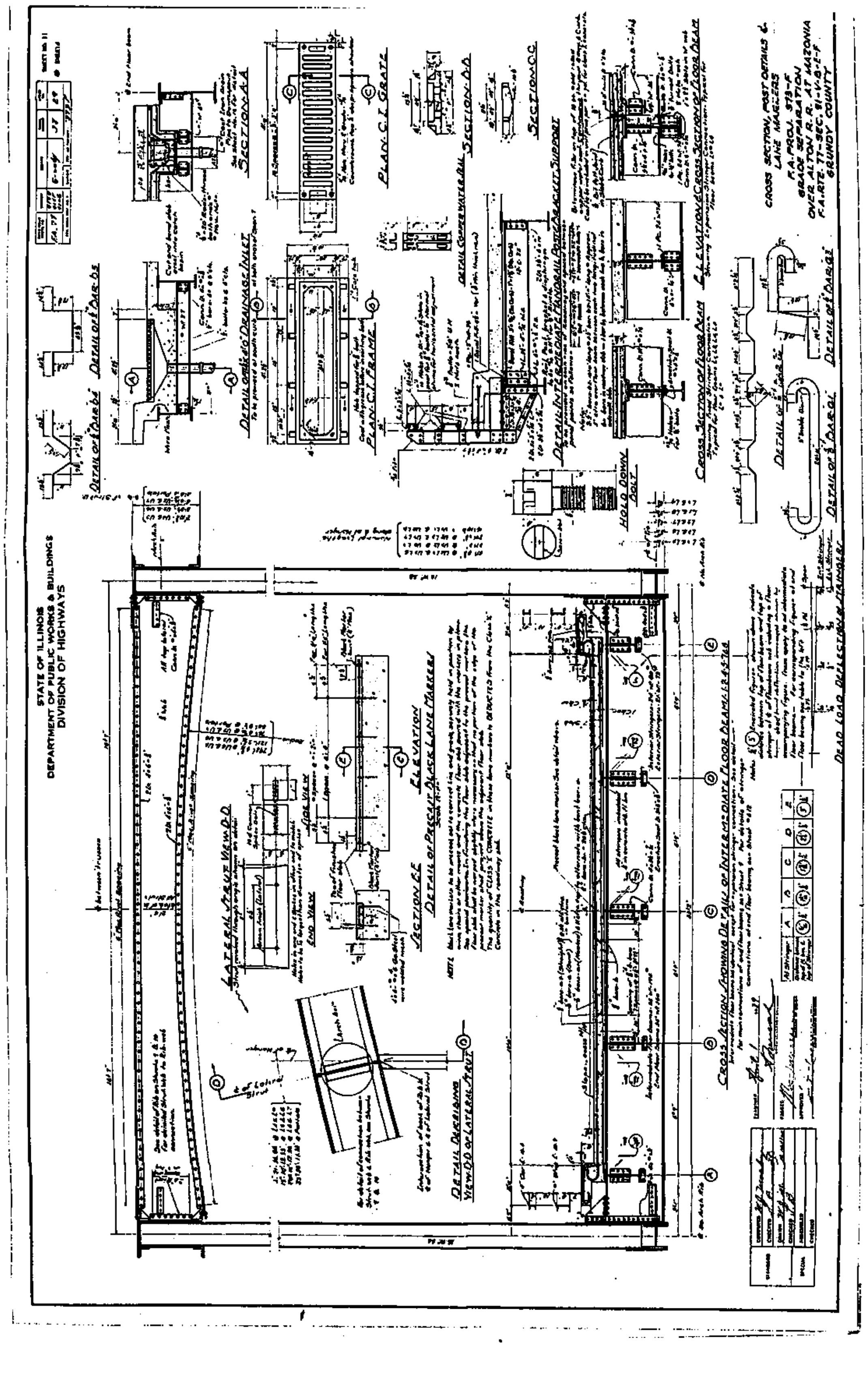
SECTION G-G
TYPICAL INTERMEDIATE HANDRAIL POST & BRACKET ELEVATION
H.R. BRACKET AT PIER
H.R. BRACKET AT COVER PL.
BLAST CL. DECKING & POST DETAILS
F.A. PROJ. 373-F
GRADE SEPARATION
OVER ALTON R.R. AT MAZONIA
F.A. RTE. 77 - SEC. 31-V-D-2-F
GRUNDY COUNTY


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
PLAN-TOP LATERAL SYSTEM
ELEVATION
PLAN FLOOR BEAMS, STRINGERS & BOTTOM LATERAL SYSTEM
STRESSES & SECTIONS IN FLOOR SYSTEM
DESIGN NOTES
BILL OF MATERIAL-SPAN 8
SECTIONS & MAXIMUM STRESSES ON ARCH
STRESS SHEET SPAN 8
GRUNDY COUNTY


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
SECTION C-C
SECTION D-D
TOP LATERAL INTERSECTION
TYPICAL LATERAL INTERSECTION
TYPICAL LATERAL HANGER
HANDRAIL CONNECTION TO ARCH RIB
VIEW A-A
L1
L2
U1
L0


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
CROSS SECTION, POST DETAILS & LANE MARKERS
F.A. PROJ. 573-F
GRADE SEPARATION
OVER ALTON R.R. AT MAZONIA
F.A. RTE. 77-SEC. 91-V-B-F
GRUNDY COUNTY
SECTION A-A
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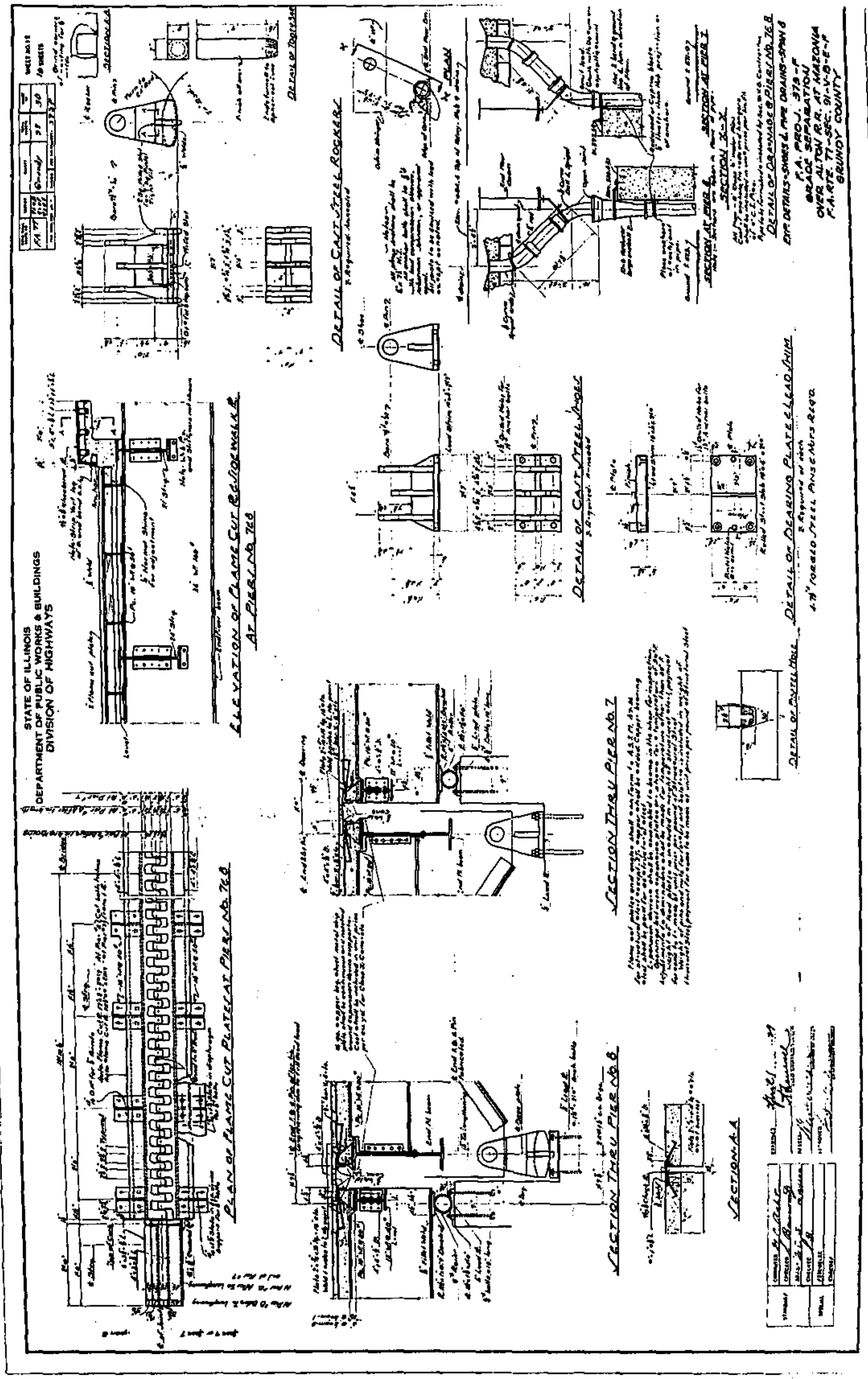
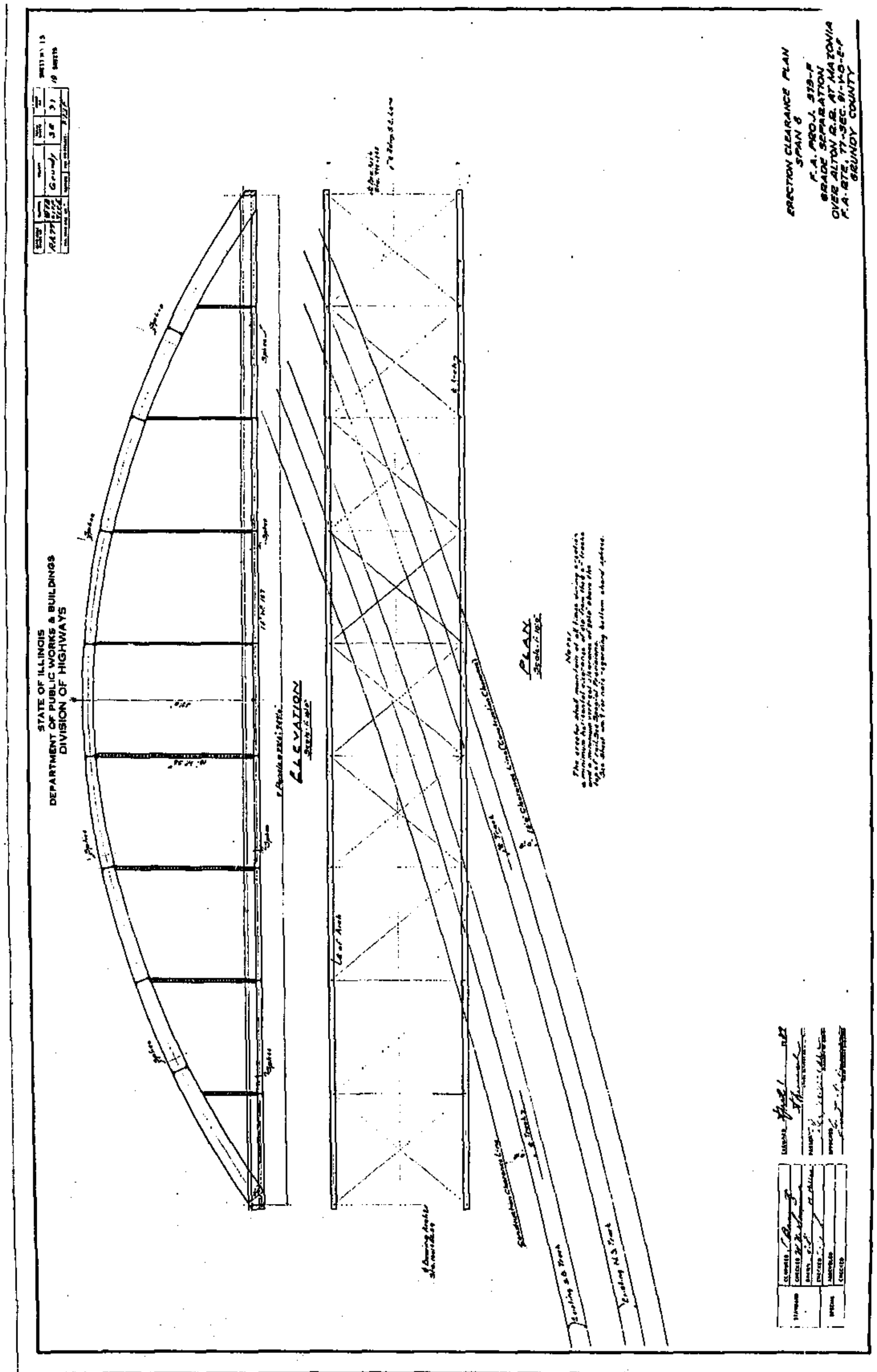
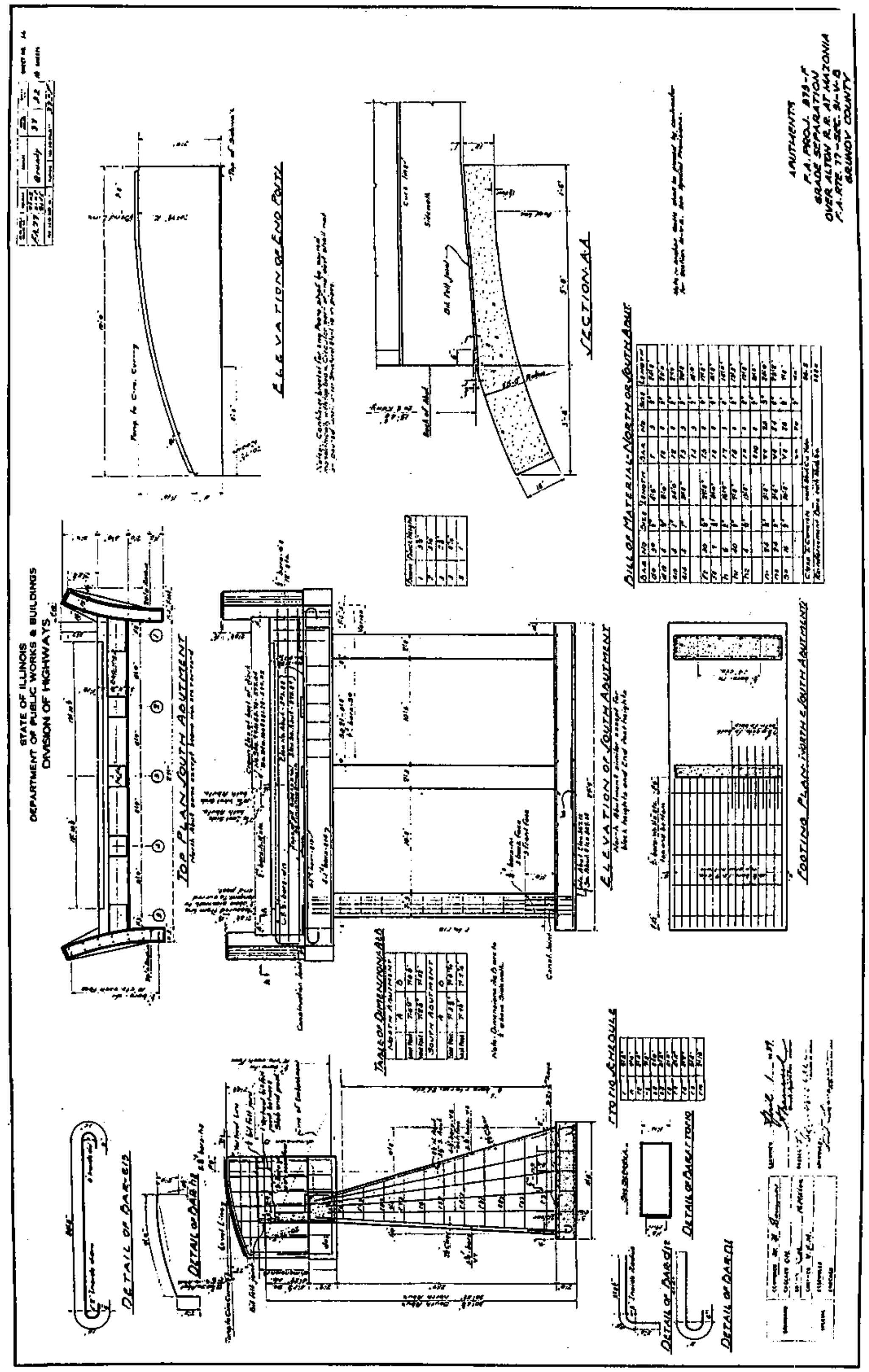
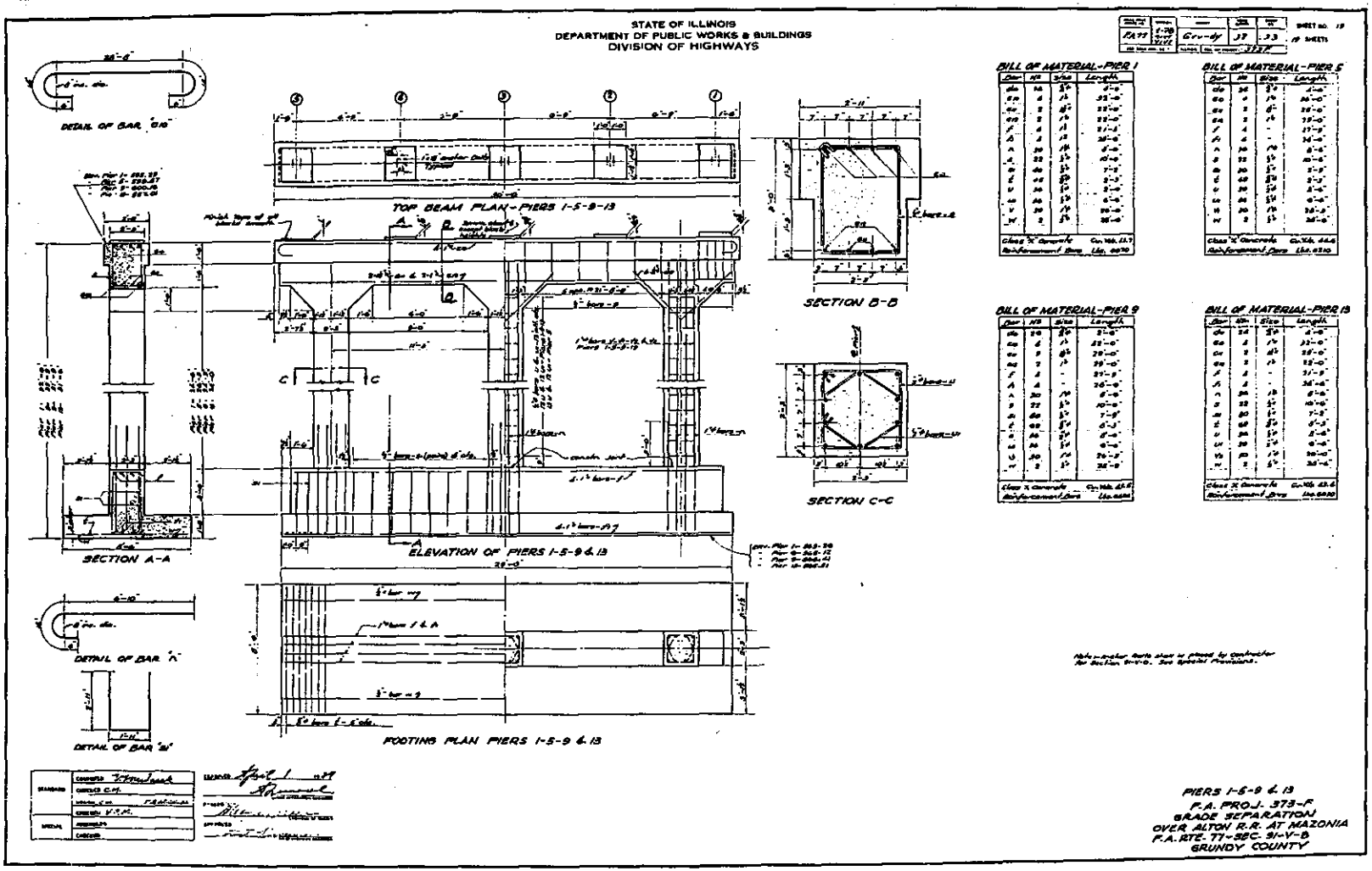
END VIEW
DETAIL OF PRECAST BLACK LANE MARKERS
DETAIL OF BAR a1
DETAIL OF BAR a2
DETAIL OF BAR a3
CROSS SECTION OF FLOOR BEAM
DEAD LOAD DEFLECTION OF MAIN GIRDER


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
SECTION THRU PIER No. 7
SECTION THRU PIER No. 8
SECTION A-A
DETAIL OF CAST STEEL ROCKERS
DETAIL OF CAST STEEL SHOES
SECTION AT PIER 8
SECTION AT PIER 7
GRADE SEPARATION
GRUNDY COUNTY


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
ELEVATION
PLAN
ERECTION CLEARANCE PLAN
SPAN 8
F.A. PROJ. 319-F
GRADE SEPARATION
OVER ALTON R.R. AT MAZONIA
F.A. RTE. 77-SEC. 91-VO-2-F
GRUNDY COUNTY


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
TOP PLAN-SOUTH ABUTMENT
ELEVATION OF SOUTH ABUTMENT
ELEVATION OF END POST
SECTION A-A
FOOTING PLAN-NORTH & SOUTH ABUTMENT
DETAIL OF BAR


STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS & BUILDINGS
DIVISION OF HIGHWAYS
DETAIL OF BAR 'G'
TOP BEAM PLAN - PIERS 1-5-9-13
SECTION B-B
SECTION C-C
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DETAIL OF BAR 'B'
FOOTING PLAN PIERS 1-5-9 & 13
BILL OF MATERIAL - PIER 1
BILL OF MATERIAL - PIER 5
BILL OF MATERIAL - PIER 9
BILL OF MATERIAL - PIER 13
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F.A. PROJ. 373-F
GRADE SEPARATION
OVER ALTON R.R. AT MAZONIA
F.A. RTE. 77 - SEC. 9I-V-B
GRUNDY COUNTY